

What is claimed is:

1. A position-control stage; comprising a bed, a turntable supported for rotation on the bed through a rolling-contact bearing, a linear motor moving the turntable relatively to the bed in a circular direction, and an encoder monitoring a relative position of the turntable to the bed;

wherein the linear motor is comprised of armature windings of primary side and field magnets of secondary side;

wherein the armature windings are each made of a three-phase coreless coil where winding turns are wound in a form of flat rectangular loop, and are circularly arranged on a disc surface of the bed along a preselected curvature in such a way lying in radial juxtaposition in circumferential direction; and

wherein the field magnets are made in a flat shape and arranged underneath the turntable in such a pattern lying radially on a disc surface of the preselected curvature in opposition to the armature windings, with their unlike poles alternating in polarity along a circular direction.

2. A position-control stage constructed as recited in claim 1, wherein the armature windings are each made in a shape of hollow rectangle while the field magnets

are each made in a shape of solid rectangle, and armature windings and the field magnets are juxtaposed respectively, with a spacing between any adjacent two increasing in circular direction as a radial distance becomes larger.

3. A position-control stage constructed as recited in claim 1, wherein the linear motor in minimum unit is comprised of three armature windings and five field magnets.

4. A position-control stage constructed as recited in claim 3, wherein there is provided a pair of the linear motors made in minimum unit in case where the position-control stage requires less circular angle in relative turning of the turntable to the bed.

5. A position-control stage constructed as recited in claim 1, wherein the field magnets are disposed on the disc surface of the turntable throughout an overall circular direction while the armature windings lie on the disc surface of the bed over a preselected area in the circular direction in case where the position-control stage requires large circular angle in relative turning of the turntable to the bed.

6. A position-control stage constructed as recited in claim 1, wherein the field magnets fit in a circular recess cut in an underside of the turntable, and the

armature windings lie circularly on a coil support that fits in a circular recess sunken below a top surface of the bed.

7. A position-control stage constructed as recited in claim 1, wherein a linear encoder to monitor any turning position of the turntable relative to the bed is comprised of an optical linear scale surrounding around an outside periphery of the turntable, and a sensor arranged on the bed.

8. A position-control stage constructed as recited in claim 7, wherein an origin mark is affixed to the underside of the turntable in opposition to the sensor of the bed at a preselected position in the circular direction.

9. A position-control stage constructed as recited in claim 1, wherein a stopper extends below the underside of the turntable while another stopper extends above the top surface of the bed, so that the turntable stops turning after the stopper has come into abutment against the another stopper, and a before-the-origin sensor and a limit sensor are installed short of the another stopper on the bed to detect when the stopper on the turntable reaches the sensors.

10. A position-control stage constructed as recited in claim 1, wherein the turntable is made at a

center thereof with an opening for looking into the interior to form a circular support where the turntable is supported for rotation on another circular support of the bed through the rolling-contact bearing.

11. A position-control stage constructed as recited in claim 1, wherein the rolling-contact bearing is abutted at an inner ring thereof against a circular shoulder formed around an outside periphery of the circular support of the turntable, and forced against the turntable with a retainer, while the rolling-contact bearing is also abutted at an outer ring thereof against an another circular shoulder formed around an inside periphery of the another circular support of the bed, and held against the bed with another retainer.

12. A position-control stage constructed as recited in claim 1, wherein there are provided a power line to convey electric power to the armature windings, a sensor line to signal to the sensors on the bed, and a signal line to receive any signal from the limit sensor and the before-the-origin sensor, and the lines are all clumped together through a cord cover attached to the bed.